UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/298,008	04/22/1999	JERRELL P. HEIN	75622.P0001	1575

7590 07/05/2002

WILLIAM D DAVIS
DAVIS & JOHNSON
PO BOX 1093
4503 W HWY 290
DRIPPING SPRINGS, TX 78620

EXAMINER
TRAN, CON P

ART UNIT	PAPER NUMBER
2644	

DATE MAILED: 07/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/298,008	HEIN ET AL.	
	Examiner	Art Unit	
	Con P. Tran	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 April 1999* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3,4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. **Claim 4** is rejected under 35 U.S.C. 102(b) as being anticipated by Stiefel U.S. Patent 5,721,774.

Regarding **claim 4**, Stiefel teaches a subscriber loop linefeed driver (see Fig. 1, 2, and respective portions of the specification), comprising:

power circuitry (BS, see col. 3, lines 2-20) for providing battery feed to a ring node and a tip node of a subscriber loop in accordance with a linefeed control signal (14, see col. 2, lines 49-53); and

sense circuitry (CL) providing a sensed tip signal and a sensed ring signal, wherein the sensed tip and ring signals correspond to a tip current and a ring current of the subscriber loop (see col. 5, lines 19-37).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. **Claims 1, 13, and 15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Akhteruzzaman U.S. Patent 5,828,748 (cited by applicants) in view of Stiefel U.S. Patent 5,721,774.

Regarding **claim 1**, Akhteruzzaman teaches an integrated circuit package (see col. 1, lines 29-32; Fig. 1, 2, and respective portions of the specification) comprising:

an integrated circuit (213) having sense inputs for a sensed tip signal (203A) and a sensed ring signal (203B) of a subscriber loop, wherein the integrated circuit (213) generates a subscriber loop linefeed driver control signal in response to the sensed signals (see col. 3, lines 23-63).

However, Akhteruzzaman reference does not explicitly disclose the linefeed driver does not reside within a same integrated circuit.

In the same field of endeavor, Stiefel teaches a subscriber loop linefeed driver (see Fig. 1, 2, and respective portions of the specification) does not reside within a same integrated circuit (see col. 7, lines 53-60) in order to reduce the likelihood of oscillation between on and off-hook indications (see Abstract, lines 18-19).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included within the Akhteruzzaman a subscriber loop linefeed driver as taught by Stiefel since such combination would have reduced the likelihood of oscillation between on and off-hook indications as suggested by Stiefel in Abstract, lines 18-19.

Regarding **claim 13**, Akhteruzzaman teaches an apparatus (see col. 1, lines 29-32; Fig. 1, 2, and respective portions of the specification) comprising:

an integrated circuit (213) generating subscriber loop control signals in response to a sensed tip signal and a sensed ring signal of a subscriber loop.

However, Akhteruzzaman reference does not explicitly disclose a linefeed driver for driving a subscriber loop in accordance with the subscriber loop control signals, the linefeed driver providing the sensed tip and ring signals.

In the same field of endeavor, Stiefel teaches a subscriber loop linefeed driver (see Fig. 1, 2, and respective portions of the specification) a linefeed driver for driving a subscriber loop in accordance with the subscriber loop control signals, the linefeed driver providing the sensed tip and ring signals (see col. 7, lines 53-60) in order to reduce the likelihood of oscillation between on and off-hook indications (see Abstract, lines 18-19).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included within the Akhteruzzaman a subscriber loop linefeed driver as taught by Stiefel since such combination would have reduced the

likelihood of oscillation between on and off-hook indications as suggested by Stiefel in Abstract, lines 18-19.

Regarding **claim 15,** Stiefel further teaches the apparatus of claim 13 (see col. 7, lines 53-60; Fig. 1, 2, and respective portions of the specification) wherein the linefeed driver comprises:

power circuitry (BS, see col. 3, lines 2-20) for providing battery feed to a ring node and a tip node of a subscriber loop in accordance with a linefeed control signal (see col. 8, lines 3-35);and

sense circuitry (CL) providing a sensed tip signal and a sensed ring signal, wherein the sensed tip and ring signals correspond to a tip current and a ring current of the subscriber loop (see col. 5, lines 19-37).

5. **Claims 2-3, 14, and 17** are rejected under 35 U.S.C. 103(a) as being unpatentable over Akhteruzzaman U.S. Patent 5,828,748 (cited by applicants) in view of Stiefel U.S. Patent 5,721,774, and further in view of Zhou U.S. Patent 5,926,544.

Regarding **claim 2,** Akhteruzzaman in view of Stiefel teaches an integrated circuit package as claimed in claim 1.

However, Akhteruzzaman in view of Stiefel does not explicitly disclose a sensed tip signal includes first and second sampled tip voltages, wherein a difference between

the first and second sampled tip voltages is proportional to the tip current, wherein the sensed ring signal includes first and second sampled ring voltages, wherein a difference between the first and second sampled ring voltages is proportional to the ring current.

In the same field of endeavor, Zhou teaches a sensed tip signal (see Fig. 3, 4, and respective portions of the specification) that includes first and second sampled tip voltages (see col. 4, lines 18-31), wherein a difference between the first and second sampled tip voltages is proportional to the tip current (see col. 5, lines 26-37), wherein the sensed ring signal includes first and second sampled ring voltages, wherein a difference between the first and second sampled ring voltages is proportional to the ring current (see col. 4, lines 18-31, col. 4, lines 48-55, and col. 5, lines 26-37) in order to provide reliable and adaptable interfacing to one or more subscriber loops (see col. 3, lines 18-20).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included within the Akhteruzzaman in view of Stiefel a sensed tip signal that includes first and second sampled tip voltages (see col. 4, lines 18-31), wherein a difference between the first and second sampled tip voltages is proportional to the tip current (see col. 5, lines 26-37), wherein the sensed ring signal includes first and second sampled ring voltages, wherein a difference between the first and second sampled ring voltages is proportional to the ring current (see col. 4, lines 18-31, col. 4, lines 48-55, and col. 5, lines 26-37), as taught by Zhou, since such combination would have provided reliable and adaptable interfacing to one or more subscriber loops as suggested by Zhou in column 3, lines 18-20.

Regarding **claim 3,** Zhou further teaches the integrated circuit package of claim 1 (see Fig. 3, and respective portions of the specification), wherein the integrated circuit is a complementary metal oxide semiconductor (CMOS) integrated circuit (see col. 5, lines 7-11).

Regarding **claim 14,** Akhteruzzaman in view of Stiefel teaches the apparatus of claim 13. However, Akhteruzzaman in view of Stiefel does not explicitly disclose an apparatus wherein the integrated circuit is a complementary metal oxide semiconductor (CMOS) integrated circuit.

In the same field of endeavor, Zhou teaches an apparatus (see Fig. 3, and respective portions of the specification) wherein the integrated circuit is a complementary metal oxide semiconductor (CMOS) integrated circuit (see col. 5, lines 7-11) in order to provide reliable and adaptable interfacing to one or more subscriber loops (see col. 3, lines 18-20).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included within the Akhteruzzaman in view of Stiefel an apparatus wherein the integrated circuit is a complementary metal oxide semiconductor (CMOS) integrated circuit (see col. 5, lines 7-11) as taught by Zhou in order to provide reliable and adaptable interfacing to one or more subscriber loops (see col. 3, lines 18-20).

Regarding **claim 17,** Akhteruzzaman in view of Stiefel teaches the linefeed driver of claim 15. However, Akhteruzzaman in view of Stiefel does not explicitly disclose a linefeed driver wherein the sensed tip signal comprises first and second sampled tip voltages, wherein a difference between the first and second sampled tip voltages is proportional to the tip current, wherein the sensed ring signal includes first and second sampled ring voltages, wherein a difference between the first and second sampled ring voltages is proportional to the ring current.

In the same field of endeavor, Zhou teaches the sensed tip signal comprises first and second sampled tip voltages (see col. 4, lines 18-31), wherein a difference between the first and second sampled tip voltages is proportional to the tip current (see col. 5, lines 26-37), wherein the sensed ring signal includes first and second sampled ring voltages, wherein a difference between the first and second sampled ring voltages is proportional to the ring current (see col. 4, lines 18-31, col. 4, lines 48-55, and col. 5, lines 26-37) in order to provide reliable and adaptable interfacing to one or more subscriber loops (see col. 3, lines 18-20).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included within the Akhteruzzaman in view of Stiefel a sensed tip signal as taught by Zhou, since such combination would have provided reliable and adaptable interfacing to one or more subscriber loops as suggested by Zhou in column 3, lines 18-20.

6. **Claim 5** is rejected under 35 U.S.C. 103(a) as being unpatentable over Stiefel U.S. Patent 5,721,774 in view of Knollman U.S. Patent 5,854,550.

Regarding **claim 5**, Stiefel teaches a subscriber loop linefeed driver (see Fig. 1, 2, and respective portions of the specification) specification) as claimed in claim 4.

However, Stiefel reference does not explicitly disclose a subscriber loop linefeed driver wherein the sense circuitry comprises:

a tip resistor series-coupled to the tip node and the power circuitry;

a pair of tip sampling resistors one end of each tip sampling resistor connected to opposite ends of the tip resistor, the other end of each tip sampling resistor forming a tip sense node;

a ring resistor series-coupled to the ring node and the power circuitry;

a pair of ring sampling resistors one end of each ring sampling resistor connected to opposite ends of the ring resistor, the other end of each ring sampling resistor forming a ring sense node.

In the same field of endeavor, Knollman teaches a subscriber loop linefeed driver (see Fig. 1, and respective portions of the specification) wherein the sense circuitry comprises:

a tip resistor (R5) series-coupled to the tip node and the power circuitry (see col. 4, lines 12-21);

a pair of tip sampling resistors (R3, R7) one end of each tip sampling resistor connected to opposite ends of the tip resistor, the other end of each tip sampling resistor forming a tip sense node (see col. 4, lines 12-47);

a ring resistor (R6) series-coupled to the ring node and the power circuitry (see col. 4, lines 12-21);

a pair of ring sampling resistors (R4, R8) one end of each ring sampling resistor connected to opposite ends of the ring resistor, the other end of each ring sampling resistor forming a ring sense node (see col. 4, lines 12-47),

in order to provide both current limiting and voltage limiting for the digital communication lines (see col. 2, lines 4-5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included within Stiefel a subscriber loop linefeed driver as taught by Knollman, since such combination would have provided both current limiting and voltage limiting for the digital communication lines as suggested by Knollman in column 2, lines 4-5.

7. **Claims 6 and 7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Stiefel U.S. Patent 5,721,774 in view of Zhou U.S. Patent 5,926,544.

Regarding **claim 6**, Stiefel teaches a subscriber loop linefeed driver (see Fig. 1, 2, and respective portions of the specification) as claimed in claim 4.

However, Stiefel reference does not explicitly disclose a subscriber loop linefeed driver wherein the sensed tip signal comprises first and second sampled tip voltages, wherein a difference between the first and second sampled tip voltages is proportional to the tip current, wherein the sensed ring signal includes first and second sampled ring voltages, wherein a difference between the first and second sampled ring voltages is proportional to the ring current.

In the same field of endeavor, Zhou teaches a subscriber loop linefeed driver (see Fig. 3, 4, and respective portions of the specification) wherein the sensed tip signal comprises first and second sampled tip voltages (see col. 4, lines 18-31), wherein a difference between the first and second sampled tip voltages is proportional to the tip current (see col. 5, lines 26-37), wherein the sensed ring signal includes first and second sampled ring voltages, wherein a difference between the first and second sampled ring voltages is proportional to the ring current (see col. 4, lines 18-31, col. 4, lines 48-55, and col. 5, lines 26-37) in order to provide reliable and adaptable interfacing to one or more subscriber loops (see col. 3, lines 18-20).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included within Stiefel a subscriber loop linefeed driver as taught by Zhou, since such combination would have provided reliable and adaptable interfacing to one or more subscriber loops as suggested by Zhou in column 3, lines 18-20.

Regarding **claim 7**, Knollman further teaches a subscriber loop linefeed driver (see Fig. 1, and respective portions of the specification) of claim 4, wherein the power circuitry comprises:

a tip control circuit, wherein the tip control circuit increases a tip node voltage in response to a first tip control signal, wherein the tip control circuit decreases a tip node voltage in response to a second tip control signal (see col. 4, lines 12-21 and see col. 5, lines 14-26); and

a ring control circuit wherein the ring control circuit increases a ring node voltage in response to a first ring control signal, wherein the ring control circuit decreases a ring node voltage in response to a second ring control signal (see col. 4, lines 12-21 and see col. 5, lines 14-26).

8. **Claims 8 and 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Stiefel U.S. Patent 5,721,774 in view of Knollman U.S. Patent 5,854,550, and further in view of Chen et al. U.S. Patent 5881,129.

Regarding **claim 8**, Stiefel in view of Knollman teaches a subscriber loop linefeed driver (see Fig. 1, 2, and respective portions of the specification) specification) as claimed in claim 4.

However, Stiefel in view of Knollman does not explicitly disclose a subscriber loop linefeed driver wherein the tip control circuit comprises:

a first transistor of a first type having an emitter coupled to receive the first tip control signal;

a second transistor of the first type having an emitter coupled to receive the second tip control signal, wherein a base of each of the first and second transistors is coupled to first node;

a third transistor of a second type having a collector coupled to a collector of the first transistor and an emitter coupled to a second node;

a resistor having a first end coupled to the second node, a second end of the resistor coupled to a base of the third transistor and a collector of the second transistor.

In the same field of endeavor, Chen et al. teaches a subscriber loop linefeed driver (see Fig. 1, 4B, and respective portions of the specification) wherein the tip control circuit comprises:

a first transistor (B30F) of a first type having an emitter coupled to receive the first tip control signal (see col. 3, lines 3-9, see col. 4, lines 12-21 and see col. 19, lines 38-41);

a second transistor (B29F) of the first type having an emitter coupled to receive the second tip control signal, wherein a base of each of the first and second transistors is coupled to first node (VPR3; see col. 19, lines 38-41);

a third transistor (B4Y2) of a second type having a collector coupled to a collector of the first transistor and an emitter coupled to a second node (see col. 20, lines 3-10);

a resistor (ALC1) having a first end coupled to the second node (VREG), a second end of the resistor coupled to a base of the third transistor (B3Y2) and a collector of the second transistor (B29F; see col. 20, lines 15-29);

in order to compensate for the transistor's finite forward resistance to prevent longitudinal imbalance (see col. 1, lines 49-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included within Stiefel in view of Knollman a subscriber loop linefeed driver having the tip control circuit as taught by Chen since such combination would have compensated for the transistor's finite forward resistance to prevent longitudinal imbalance as suggested by Chen et al. in column 1, lines 49-50.

Regarding **claim 9**, Chen et al. teaches a subscriber loop linefeed driver (see Fig. 1, 4B, and respective portions of the specification) of claim 8 wherein the first type is a PNP bipolar junction transistor (B29F), wherein the second type is an NPN bipolar junction transistor (B3Y2; see col. 20, lines 3-9).

9. **Claims 10-12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Stiefel U.S. Patent 5,721,774 in view of Bellenger et al. U.S. Patent 6,63016.

Regarding **claim 10**, Stiefel teaches a subscriber loop linefeed driver (see Fig. 1, 2, and respective portions of the specification) as claimed in claim 4.

However, Stiefel reference does not explicitly disclose a subscriber loop linefeed driver further comprising:

voiceband circuitry for bi-directional communication of voiceband data between the ring and tip nodes and a voiceband data interface, wherein the voiceband circuitry provides the analog voiceband data interface with d.c. isolation from the ring and tip nodes.

In the same field of endeavor, Bellenger et al. teaches a subscriber loop linefeed driver (see Fig. 1A, 1B, 2A, 2B, 3, and respective portions of the specification) further comprising:

voiceband circuitry for bi-directional communication of voiceband data between the ring and tip nodes and a voiceband data interface (see col. 12, lines 21-30), wherein the voiceband circuitry provides the analog voiceband data interface with d.c. isolation from the ring and tip nodes (see col. 22, lines 48-54) in order to retrieve transmission parameters associated with the data terminal and the interface (see col. 4, lines 52-53).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included within Stiefel a subscriber loop linefeed driver further comprising:

voiceband circuitry for bi-directional communication of voiceband data between the ring and tip nodes and a voiceband data interface (see col. 12, lines 21-30), wherein the voiceband circuitry provides the analog voiceband data interface with d.c. isolation from the ring and tip nodes (see col. 22, lines 48-54) as taught by

Bellenger et al. since such combination would have allowed retrieving transmission parameters associated with the data terminal and the interface as suggested by Bellenger et al. in column 4, lines 52-53.

Regarding **claim 11,** Bellenger et al. further teaches an apparatus of claim 10, wherein the voiceband circuitry (see Fig. 2A, 2B, 4, and respective portions of the specification) further comprising:

a first voiceband data output node (see col. 17, lines 26-35);

a load coupled to the first voiceband data output node (see col. 17, lines 26-35);

a first voiceband data input node, wherein the load and the first voiceband data input node are capacitively coupled to a selected one of the tip and ring nodes (see col. 16, lines 7-13 and col. 7, line 59 – col. 8, line 5).

Regarding **claim 12,** Bellenger et al. further teaches the apparatus of claim 4 (see Fig. 1A, 1B, 2A, 2B, 3, and respective portions of the specification) further comprising voiceband circuitry for bi-directional communication of voiceband data between the ring and tip nodes and a voiceband data interface, wherein the voiceband circuitry further comprises (see col. 12, lines 21-30 and col. 22, lines 48–54):

a first voiceband data input node capacitively coupled to a selected one

of the ring and tip nodes for receiving voiceband data from the subscriber loop, wherein voiceband data transmitted to the subscriber loop is superimposed on the linefeed control signals (see col. 16, lines 7-13 and col. 7, line 59 – col. 8, line 5).

10. **Claims 16 and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over Akhteruzzaman U.S. Patent 5,828,748 (cited by applicants) in view of Stiefel U.S. Patent 5,721,774, and further in view of Knollman U.S. Patent 5,854,550

Regarding **claim 16,** Akhteruzzaman in view of Stiefel teaches an linefeed driver of claim 15. However, Akhteruzzaman in view of Stiefel does not explicitly disclose the linefeed driver wherein the sense circuitry comprises:

a tip resistor series-coupled to the tip node and the power;

a pair of tip sampling resistors one end of each tip sampling resistor connected to opposite ends of the tip resistor, the other end of each tip sampling resistor forming a tip sense node;

a ring resistor series-coupled to the ring node and the power;

a pair of ring sampling resistors one end of each ring sampling resistor connected to opposite ends of the ring resistor, the other end of each ring sampling resistor forming a ring sense node.

In the same field of endeavor, Knollman teaches the sense circuitry (see Fig. 1, and respective portions of the specification) comprises:

a tip resistor series-coupled to the tip node and the power circuitry (see col. 4, lines 12-21);

a pair of tip sampling resistors (R3, R7) one end of each tip sampling resistor connected to opposite ends of the tip resistor, the other end of each tip sampling resistor forming a tip sense node (see col. 4, lines 12-47);

a ring resistor (R6) series-coupled to the ring node and the power circuitry (see col. 4, lines 12-21);

a pair of ring sampling resistors (R4,R8) one end of each ring sampling resistor connected to opposite ends of the ring resistor, the other end of each ring sampling resistor forming a ring sense node (see col. 4, lines 12-47);

in order to provide both current limiting and voltage limiting for the digital communication lines (see col. 2, lines 4-5).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included within Akhteruzzaman in view of Stiefel a sense circuitry as taught by Knollman, since such combination would have provided both current limiting and voltage limiting for the digital communication lines as suggested by Knollman in column 2, lines 4-5.

Regarding **claim 18,** Knollman further teaches the linefeed driver of claim 15 wherein (see Fig. 1, and respective portions of the specification) the power circuitry comprises:

a tip control circuit, wherein the tip control circuit increases a tip node

voltage in response to a first tip control signal, wherein the tip control circuit decreases a tip node voltage in response to a second tip control signal (see col. 4, lines 12-21 and col. 5, lines 14-26); and

a ring control circuit wherein the ring control circuit increases a ring node voltage in response to a first ring control signal, wherein the ring control circuit decreases a ring node voltage in response to a second ring control signal (see col. 4, lines 12-21 and col. 5, lines 14-26).

11. **Claims 19** and **20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Akhteruzzaman U.S. Patent 5,828,748 (cited by applicants), in view of Stiefel U.S. Patent 5,721,774, in view of Knollman U.S. Patent 5,854,550, and further in view of Chen et al. U.S. Patent 5881,129.

Regarding **claim 19,** Akhteruzzaman in view of Stiefel, and further in view of Knollman teaches an linefeed driver of claim 18. However, Akhteruzzaman, Stiefel and Knollman in combination fails to clearly disclose the tip control circuit comprises:

a first transistor of a first type having an emitter coupled to receive the first tip control signal;

a second transistor of the first type having an emitter coupled to receive the second tip control signal, wherein a base of each of the first and second transistors is coupled to first node;

a third transistor of a second type having a collector coupled to a collector of the first transistor and an emitter coupled to a second node; and

a resistor having a first end coupled to the second node, a second end of the resistor coupled to a base of the third transistor and a collector of the second transistor

In the same field of endeavor, Chen et al. teaches a linefeed driver (see Fig. 1, 4B, and respective portions of the specification) wherein the tip control circuit comprises:

a first transistor (B30F) of a first type having an emitter coupled to receive the first tip control signal (see col. 3, lines 3-9, see col. 4, lines 12-21 and see col. 19, lines 38-41);

a second transistor (B29F) of the first type having an emitter coupled to receive the second tip control signal, wherein a base of each of the first and second transistors is coupled to first node (VPR3; see col. 19, lines 38-41);

a third transistor (B4Y2) of a second type having a collector coupled to a collector of the first transistor and an emitter coupled to a second node (see col. 20, lines 3-10);

a resistor (ALC1) having a first end coupled to the second node (VREG), a second end of the resistor coupled to a base of the third transistor (B3Y2) and a collector of the second transistor (B29F; see col. 20, lines 15-29);

in order to compensate for the transistor's finite forward resistance to prevent longitudinal imbalance (see col. 1, lines 49-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included within Stiefel in view of Knollman a linefeed driver having the tip control circuit as taught by Chen since such combination would have compensated for the transistor's finite forward resistance to prevent longitudinal imbalance as suggested by Chen et al. in column 1, lines 49-50.

Regarding **claim 20**, Chen et al. teaches a linefeed driver (see Fig. 1, 4B, and respective portions of the specification) of claim 8 wherein the first type is a PNP bipolar junction transistor (B29F), wherein the second type is an NPN bipolar junction transistor (B3Y2; see col. 20, lines 3-9).

12. **Claims 21-23** and are rejected under 35 U.S.C. 103(a) as being unpatentable over Akhteruzzaman U.S. Patent 5,828,748 (cited by applicants) in view of Stiefel U.S. Patent 5,721,774,and further in view of Bellenger et al. U.S. Patent 6,63016.

Regarding **claim 21**, Akhteruzzaman in view Stiefel in teaches a linefeed driver (see Fig. 1, 2, and respective portions of the specification) as claimed in claim 15.

However, Akhteruzzaman in view Stiefel does not explicitly disclose a linefeed driver further comprising:

voiceband circuitry for bi-directional communication of voiceband data

between the ring and tip nodes and a voiceband data interface, wherein the voiceband circuitry provides the analog voiceband data interface with d.c. isolation from the ring and tip nodes.

In the same field of endeavor, Bellenger et al. teaches a subscriber loop linefeed driver (see Fig. 1A, 1B, 2A, 2B, 3, and respective portions of the specification) further comprising:

voiceband circuitry for bi-directional communication of voiceband data between the ring and tip nodes and a voiceband data interface (see col. 12, lines 21-30), wherein the voiceband circuitry provides the analog voiceband data interface with d.c. isolation from the ring and tip nodes (see col. 22, lines 48-54) in order to retrieve transmission parameters associated with the data terminal and the interface (see col. 4, lines 52-53).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included within Akhteruzzaman in view Stiefel a linefeed driver further comprising:

voiceband circuitry for bi-directional communication of voiceband data between the ring and tip nodes and a voiceband data interface (see col. 12, lines 21-30), wherein the voiceband circuitry provides the analog voiceband data interface with d.c. isolation from the ring and tip nodes (see col. 22, lines 48-54) as taught by Bellenger et al. since such combination would have allowed retrieving transmission parameters associated with the data terminal and the interface as suggested by Bellenger et al. in column 4, lines 52-53.

Regarding **claim 22,** Bellenger et al. further teaches an apparatus of claim 21, wherein the voiceband circuitry (see Fig. 2A, 2B, 4, and respective portions of the specification) further comprising:

a first voiceband data output node (see col. 17, lines 26-35);

a load coupled to the first voiceband data output node (see col. 17, lines 26-35);

a first voiceband data input node, wherein the load and the first voiceband data input node are capacitively coupled to a selected one of the tip and ring nodes (see col. 16, lines 7-13 and col. 7, line 59 – col. 8, line 5).

Regarding **claim 23,** Bellenger et al. further teaches the apparatus of claim 15 (see Fig. 1A, 1B, 2A, 2B, 3, and respective portions of the specification) further comprising voiceband circuitry for bi-directional communication of voiceband data between the ring and tip nodes and a voiceband data interface, wherein the voiceband circuitry further comprises (see col. 12, lines 21-30 and col. 22, lines 48–54):

a first voiceband data input node capacitively coupled to a selected one of the ring and tip nodes for receiving voiceband data from the subscriber loop, wherein voiceband data transmitted to the subscriber loop is superimposed on the linefeed control signals (see col. 16, lines 7-13 and col. 7, line 59 – col. 8, line 5).

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Inventor	Publication	Number	Disclosure
Chen et al.	US Patent	6,301,358	Dual-slope current battery-feed circuit.
Stiefel	US Patent	5,659,608	Life feed circuit with logic level controlled ringing.
Tanimoto et al.	US Patent	5,717,720	Subscriber line interface circuit.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Con P. Tran whose telephone number is (703) 305-2341. The examiner can normally be reached on M - F (8:30 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W. Isen can be reached on (703) 305-4386. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Customer Service Office at telephone number (703) 306-0377.

cpt CPT
July 1, 2002

FORESTER W. ISEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600